This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

PCT

WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : H04Q 3/00, H04M 3/48

A1

(11) International Publication Number: WO 00/41406

(43) International Publication Date: 13 July 2000 (13.07.00)

(21) International Application Number: PCT/SE99/02204

(22) International Filing Date: 26 November 1999 (26.11.99)

(30) Priority Data:
9804598-2 30 December 1998 (30.12.98) SE

(71) Applicant: TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE).

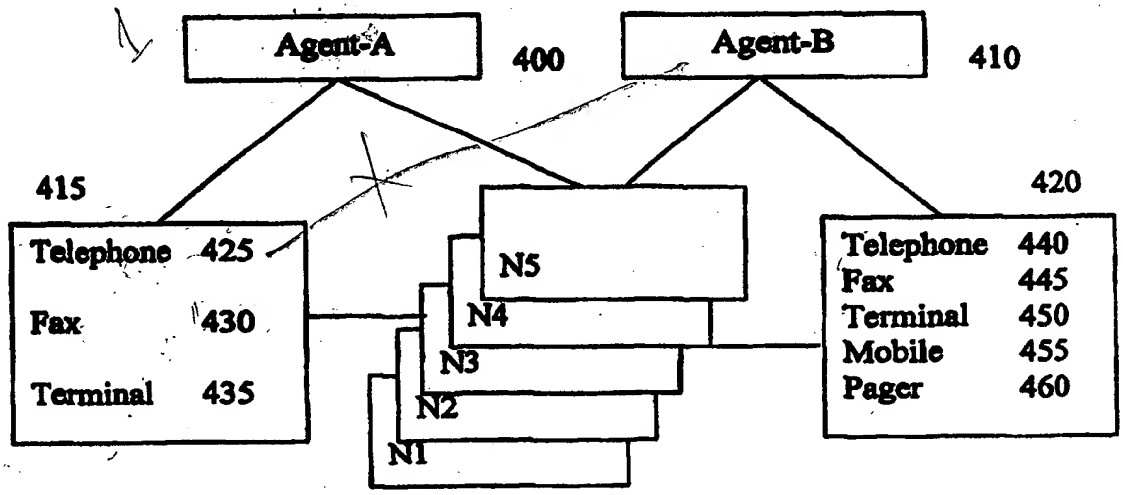
(72) Inventors: WILLEHADSON, Stefan; Spetsvägen 22, S-757 57 Uppsala (SE). MONTELIUS, Johan; Wargentinsgatan 2, S-112 29 Stockholm (SE). GABRIELSSON, Jan; Åkervägen 8, S-190 40 Sollentuna (SE).

(74) Agent: ERICSSON RESEARCH; Ericsson Radio Systems AB, Patent Support Unit, S-164 80 Stockholm (SE).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(54) Title: AN AGENT BASED DISTRIBUTED CALL SETUP METHOD



(57) Abstract

The present invention relates generally to an agent-based method for setting up a call between at least two parties. More particularly the invention relates to a method of performing call screening and terminal matching during call setup, when the parties involved have several communication terminals. This is solved by means of an agent-based distributed call setup algorithm where a distributed agent (400, 410) represents each party in the system. The agents have information about the respective party's communication terminals, their addresses and the capabilities of said terminals. Each agent also has information about the whereabouts of the user, and is used as a secretary assisting in the call setup process. From the parties' point of view the call interface is similar with the interfaces of today, however, the call setup method offers a much more powerful service where terminals are matched and screening performed.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

AN AGENT BASED DISTRIBUTED CALL SETUP METHOD

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to agent-based methods for setting up calls between at least two parties. More particularly the invention relates to a method of performing call screening and terminal matching during call setup when the parties involved each has several communication terminals.

The invention also relates to an arrangement for carrying out said method.

DESCRIPTION OF RELATED ART

Today it is very common that a person has several communication terminals with different capabilities, e.g. a mobile phone, an Internet connected computer, a fax or an ordinary phone. In order to reach a person, a phone number has to be dialled or an Internet address or an URL (Universal Resource Locator) has to be entered on the calling terminal to set up the call. The phone number dialled is actually an identification of the terminal or extension that is dialled; hence the phone number maps directly to a physical address.

One of the problems with the traditional method of setting up a call is that when a person changes terminals his physical address changes and a new number must be dialled to reach him. It is thus necessary for the calling party to know the addresses of the called party's terminals since he does not know on which terminals the called party is currently available. The calling party is also forced to try one network after the other before finally reaching the other party. The parties must also find terminals with matching capabilities in order to set up a call.

Various solutions to the problem of call setup between parties with several communication terminals have been proposed. These include e.g. call forwarding or use of a personal number. It is, however, very difficult to configure call screening and forwarding of calls if a person has several terminals since it normally must be performed from each terminal on a per call basis. The fact that it most probably is different operators for each communication terminal also means that the user has to pay for all call forwarding. A personal number service, on the other hand, suffers from the drawback that the party may forget to report in to the system when he changes location.

In addition to these solutions, proposals have been made which use agents to set up the call. An agent is computer software designed to perform some action automatically for the user. Many agents are designed to be intelligent, in the sense of artificial intelligence and smart reasoning. For example, agents have been designed to search the WWW for web-sites based on a user's preferences. In comparison, other types of agents are more simplistic and merely react to particular environmental changes and alarms.

In US, A, 5 539 813 is disclosed a method and a system for establishing communication between two users, A and B, in the form of a meeting. Party A attempts to place a call to party B by using an agent in the form of an intermediary called a meeting broker. The meeting broker negotiates with the users in order to establish the conditions under which the proposed meeting, i.e. the telephone call, will take place. A connection between the users A and B is not established until both users A and B are in agreement with the conditions. The problem with this negotiation is that many parameters must be negotiated before a solution, which is inevitably a compromise, is found. If any of the users does not agree on the conditions the negotiation process begins again, occupying more time and network resources. How to find terminals with matching

capabilities and how to perform call screening when the parties have several terminals is not discussed.

From WO, A1, 96/08909 is previously known an intelligent network including a set of service control programs containing individual service profiles which define the individual services provided to users of the network. During call setup, a service control program (SCP) which acts as agent for the originating user is generated from the service profile for the originating user and an SCP which acts as agent for the terminating user is generated from the service profile for the terminating user. The two SCP's then enter into a dialogue with each other in order to generate call control instructions. The purpose of the invention is mainly to provide services such as e.g. toll free 1-800-numbers, call barring and debiting. The problems associated with call screening and terminal matching when the parties have several terminals is not discussed. Instead the document describes how the agent negotiates with the hardware to set up a call.

Another example of the use of agents is described in EP, A1, 825 787, showing a connection management system aimed at avoiding feature interaction conflicts, e.g. the conflict between "Call Forwarding" and "Call Waiting". Agents are used to negotiate an appropriate connection configuration between the users. Again nothing is mentioned about how to match different terminals during call setup or how to perform call screening when the parties have several communication terminals.

The general problem with the currently known approaches, using software agents, is that they are too intelligent. They try to negotiate for the best conditions under which to set up a call. Unfortunately, all this negotiating consumes valuable network resources and time. The desired conditions may not be available as one of the agents options which forces the system to go to the user to request permission for call setup all the same or for further negotiations. Another result of this need for

negotiation is that the negotiation is best performed in a centralised location, making distributed solutions impractical.

SUMMARY OF THE INVENTION

The present invention deals with the problems of how to perform call screening and terminal matching during call setup between at least two parties each having several communication terminals.

It is very common today that communication system users have several communication terminals, hence the calling party does not know on which terminal the called party currently is available. Another problem, since parties have several terminals, is that call screening normally has to be performed for each terminal on a per call basis.

The fact that the parties have several communication terminals often with different capabilities, e.g. IP-phones, mobile phones, text-based terminals etc. also implies that the parties must find communication terminals with matching capabilities in order to be able to set up a call.

One object of the present invention is thus to provide a method of communication in which the calling party does not need to be aware of the access ports of the called party in all of the communication networks at the disposal of the called party.

Another object of the invention is to provide a method where call screening and terminal matching is done for all communication terminals simultaneously as opposed to on a per call basis for each terminal.

The above mentioned objects are achieved by means of an agent-based distributed call setup algorithm where a distributed agent represents each party in the system. The agent has information about the respective party's communication terminals their addresses and the capabilities of said terminals. The agent also has information about the whereabouts

of the user, and is used as a secretary that assists in the call setup process.

The following scenario from the calling user's, user A, point of view describes the invention in a highly simplified form.

When the first user, user A, wants to communicate with a second user, user B, the first user sends a request to his agent, agent-A, to place a call to user B. Agent-A then presents which terminals user A is available on to agent-B, user B's agent. Agent-B then performs call screening on the incoming call request from agent-A. If said call screening results in call accept, matching terminals between agent-A and agent-B are found. From a list of matching terminals user B then chooses to either reject the call or to accept the call on one of the matching terminals in said list, if the matching results in at least one match.

From the parties' point of view the call interface is similar with the interfaces of today, however, the call setup method offers a much more powerful service where terminals are matched and screening performed. The method simplifies the call setup process when a party has more than one terminal. Furthermore, no centralised mediator is needed since this is a distributed solution.

The term **call** as used in this application is not limited to voice or speech transmissions. It is clear to persons working in this technical field that the present invention will also work with other types of transmission e.g. data.

The term **user** as used in this application may be a person an item of equipment or a computer-based application using communication services. The terms **part or party** are synonymous to the term user.

Although the invention has been summarised above the method and arrangement according to appended independent claims 1 and 11.

Various embodiments are further defined in dependent claims 2-10 and 12-16.

BRIEF DESCRIPTION OF THE DRAWINGS

Figures 1A-D shows the configuration and functions of an agent.

Figures 2A-B shows flowcharts over two scenarios from the users' side.

Figure 3 shows a flowchart over the call setup algorithm.

Figure 4 graphically illustrates how a call is setup in one embodiment of the invention.

Figure 5 illustrates how terminals with matching capabilities are found

DESCRIPTION OF PREFERRED EMBODIMENTS

The present invention uses software agents to set up calls between users having several terminals with different capabilities. Each user of the communication system is monitored by his or her own agent, here defined to be an autonomous and long-lived software process that reacts on environmental changes and alarms. These agents are not necessarily intelligent in the sense of artificial intelligence and smart reasoning, but they are pro-active in the sense that they take action according to environmental changes and alarms. In the embodiments discussed below, there is a one-to-one relationship between agents and users, although it does not necessarily have to be so. The agents are also distributed rather than centralised as in most prior solutions.

Now referring to figures 1A-D, the configuration and function of the different parts of an agent will be described. As can be seen in figure 1A the agent, 100, consists of three parts; a list of terminals, 105, a profile of whereabouts, 110, and two screening lists, 115.

The list of terminals, 105, shown in figure 1B, may, in addition to terminal numbers, 120, and addresses, 125, e.g.

phone numbers or URL's, contain the location, 130, and the capabilities, 135, of the terminals. When the terminal was last used, 140, is also stored in the list. The list of terminals for user A is called terms-A and correspondingly, terms-B for user B.

The profile of whereabouts, 110, shown in figure 1C, is a matrix defining where the user most probably is located, 150, at certain times, 145, and what terminals, 155, the user is accepting calls on. The profile of whereabouts, 110, is also used for decisions concerning call screening. For example, if the clock is between 12.00-13.00 or the user has reported in a lunch break to the agent only urgent calls on the mobile phone are accepted.

The screening lists, 115, shown in figure 1D, are used together with the profile of whereabouts, 110, in call screening. The screening lists, 115, simply list the addresses, e.g. phone numbers or URL's, of persons to accept immediately in a first list, 160, and the addresses of persons to reject immediately in a second list, 165.

All three parts of the agent are updated by the user whenever there are status changes, e.g. when the user changes location, when a new communication terminal needs to be added or the screening lists needs to be updated. Each agent acts on behalf of its respective user in the call setup process as a kind of secretary.

In figure 2A a flowchart of a possible scenario from the calling user's, user A, viewpoint is shown. User A first selects user B, 200, which is the called user, in his terminal phonebook. If the call is not rejected, user B answers the call, 210. If user B instead rejects the call or doesn't answer, 220, user A may be shown a list of alternative ways of reaching user B, such as voice-mail or e-mail, 230.

In figure 2B a possible scenario from the called user's, user B's, viewpoint is described. The calling user, user A, is

presented to user B on his terminal, 240. If user B's agent rejected the call without user B's involvement, user B may be notified about that, 250. This can happen for example when user B has informed his agent that he is unavailable. If the call was not rejected user B is offered a list of matching terminals on which to accept user A's call, 260. User B then accepts the call on one of the matching terminals, 270. If user B rejects the call, 280, he can supply his agent with a list of alternative ways to reach him, e.g. voice-mail or e-mail. As can be seen the described scenarios do not affect the user interface much.

With reference to the flowchart in figure 3, describing the call setup algorithm, a more detailed description of the invention from the calling and called users' sides, will be made. Suppose user A wants to communicate with user B, both users having several terminals with different capabilities. To overcome the problem of not knowing on what terminals user B is available on, user A first chooses user B in his phonebook. This results in user A requesting his agent to place a call to user B, 300. The call request consists of the terminals, terms-A, that user A is available on, which is presented to agent-B, 305. Agent-B then performs call screening on the incoming call request from agent-A, 310, based on user B's profile of whereabouts together with the screening lists. For example no job related calls will be admitted if the user is registered as being at home in the profile of whereabouts. If said call screening results in call accept the agents start matching terminals by comparing terms-A with the corresponding list, terms-B, present in agent-B, 340. The intersection between terms-A and terms-B which represents the terminals with matching capabilities is then presented to user B on his terminal, 342. User B then chooses to either accept or reject the call, 344. The call may be rejected because user B is unavailable, because user B has no matching terminals or because user A is not accepted. If the call is rejected agent-B informs agent-A that user B did not accept the call, 320.

Agent-A may then, depending on his configuration, ask agent-B for an alternative way to contact user B, e.g. voice-mail or e-mail, 324. When user B accepts the call agent-B completes the call setup, 346.

Another possibility when the called user rejects the call is to fallback on "Call Matching", 322, as described in the Swedish patent application SE-9802138-9, hereby incorporated by reference, which relates to the problem of setting up a call when one of the users is unavailable. Each user is provided with a software agent, which uses a Pending Call List, PCL. Both users have their own PCL, which is a list containing all calls that have been either received or placed but not completed. When a call is placed, an entry is inserted in the caller's PCL and marked as accepting. The received call is placed in the called user's PCL. It is marked as either accepting or on-hold depending on the called user's status. When both users mark the call as accepting, the call is established.

Figure 4 shows user A, 415, and user B, 420, subscribing to services in different communication networks N1-N5. The network N1 is the standard telephone network, the network N2 is a telex network, the network N3 is a packet switched data network, the network N4 is the mobile telephone network and the network N5 is a paging network, e.g. a radio network. In this example user A, 415, subscribes to services in network N1-N3, whereas user B, 420, subscribes to services in all networks N1-N5. User A, 415, has a conventional telephone, 425, a fax apparatus,430, and a terminal unit, 435, that gives access to the packet switched data network, N3. User B, 420, also has a conventional telephone, 440, a fax apparatus, 445, and a terminal unit, 450, connected to the packet switched data network, N3. In addition to that, user B, 420, also has a mobile telephone, 455, connected to the mobile network N4 and a paging receiver, 460, connected to the paging network N5.

Figure 5 illustrates how matching terminals are found. For example when user A wants to talk to user B he uses the conventional telephone, 425. Agent-A then presents to agent-B the list of terminals that user A is available on, i.e. the conventional telephone, 425, the fax, 430, and the terminal unit, 435. User B is then presented a list of matching terminals, 500, either by voice, on a GUI (Graphical User Interface) or by DTMF signalling. Said presentation of the matching terminals is done in the order of most probable terminal to least probable terminal taking in consideration the user's terminal lists, with a note on latest used terminal and the profiles of whereabouts. The connection between the users and their agents is either logical or factual. For example the users may have a special terminal unit for communicating with their respective agents.

In this particular example user B, 420, is given the option to accept user A's call on the conventional telephone, 440, the mobile, 455, the terminal unit, 450, the fax, 445, or the pager, 460. User B, 420, chooses the terminal unit, 450, and an e-mail dialog is started. The effect of this is thus that user A, 415, starts the communication on one network, i.e. the telephone network, N1, but the final communication is established in another network, i.e. on the packet switched data network, N3.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

CLAIMS

1. A method of setting up a call between at least two telecommunications system users (415,420), each user having at least two telecommunication terminals, via at least one telecommunication network, wherein a first user (415) has a first distributed agent (400) and a second user (420) has a second distributed agent (410) and said first user (415) requests said first distributed agent (400) to place a call to said second user (420),

characterised in that the method comprises the steps of

performing call screening by said second distributed agent (410) on the incoming call request from said first distributed agent (400);

matching the telecommunication terminals between the first distributed agent (400) and the second distributed agent (410) if said call screening results in call accept; and

giving said second user (420) the option to either accept said first user's (415) call on one of said matching telecommunication terminals or to reject the call, if said matching results in at least one match.

2. The method of claim 1

further **characterised** in

storing in each of said distributed agents (400; 410) the respective user's terminals addresses, the location of said terminals and the capabilities of said terminals.

3. The method of claim 2

further **characterised** in

storing in each of said agents (400; 410) a first list for users that should be accepted immediately and a second list for users that should be rejected immediately.

4. The method of claim 2 or 3

further **characterised** in

storing in each of said distributed agents (400; 410) a profile of the respective user's (415, 420) whereabouts.

5. The method of claim 4

further **characterised** in that

said call screening is based on either said first and second lists or said first and second list together with the second user's (420) profile of whereabouts and with information about the first user's (415) identity.

6. The method according to claim 4

further **characterised** in that

said profile of whereabouts is updated by the respective user (415; 420).

7. The method of any of the preceding claims

further **characterised** in that

said matching of terminals is performed by comparing the respective agents' (400;410) information about the users' (415,420) telecommunication terminals and obtaining from that an intersection of matching capabilities; and

presenting said intersection of said terminals of matching capabilities to the second user (420).

8. The method of any of the preceding claims

further **characterised** in that

said call screening automatically results in a rejected call when the first and second users (415;420) have no matching telecommunication terminals.

9. The method of any of the preceding claims

further **characterised** in that

said call screening automatically results in a rejected call when said second user (420) is not available.

10. The method of any of the preceding claims

characterised in further comprising the steps of:

the second agent (410) informing the first agent (400) that the call is not completed; and

the first agent (400) requesting the second agent(410) for means to leave a message to said second user (420)

if the second user (420) or agent-b (410) rejected the call

11. A telecommunication system for setting up a call between at least a first user (415) and a second user (420), via at least one telecommunication network, each user (415;420) having at least two telecommunication terminals, the first user (415) having a first distributed agent (400) and the second user (420) having a second distributed agent (410), said agent (410)

characterised by comprising

means for performing call screening on an incoming call request from said first distributed agent (400)

means for matching telecommunication terminals between the first user (415) and the second user (420)

means for giving said second user (420) the option to either accept said first user's (415) call on one of said matching telecommunication terminals or to reject the call.

12. A telecommunication system according to claim 11

characterised by further comprising

means for storing in each of said distributed agents (400; 410) the respective user's terminals addresses, the location of said terminals and the capabilities of said terminals.

13. A telecommunication system according to claim 12

characterised by further comprising

means for storing in each of said distributed agents (400; 410); a first list for users that should be accepted immediately and a second list for users that should be rejected immediately.

14. A telecommunication system according to claim 12 or 13

characterised by further comprising

means for storing in each of said distributed agents(400; 410) a profile of their respective user's whereabouts.

15. A telecommunication system according to claim 14

characterised by further comprising

means for performing call screening based on either said first and second lists or said first and second lists together with the second user's (415) profile of whereabouts and with knowledge about the identity of the first user (420).

16. A telecommunication system according to claim 14 **characterised** by further comprising

means for receiving updates of said profile of whereabouts for the respective user (415; 420).

1/4

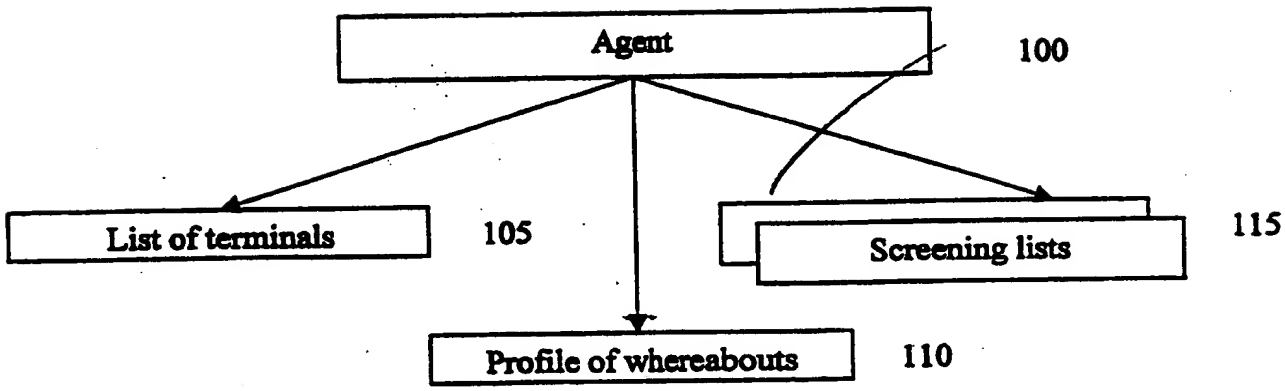


Fig. 1A

105

120 NR	125 ADDRESS	130 LOCATION	135 CAPABILITIES	140 USED
I	070	Personal	Phone, Fax	08.10
II	08	Home	Phone	07.30
III	@	Work	IP-Phone	09.25

Fig. 1B

110

145 TIME	150 LOCATION	155 PRIORITIES
06.00-08.00	Home	I, II
08.00-12.00	Work	I, III
12.00-13.00	Lunch	I, Urgent
13.00-17.00	Work	I, III
17.00-22.00	Home	I, II
22.00-06.00	Sleep	II, Urgent

Fig. 1C

115

160 ACCEPT	165 REJECT
Friends	Sales calls
08-.....	08-.....
070-8...	070-3.....
@	

Fig. 1D

2/4

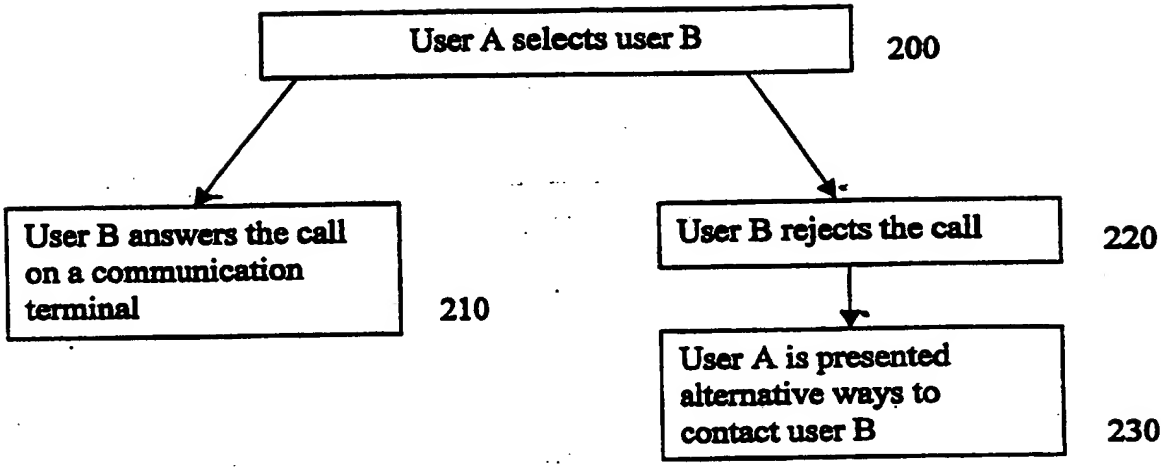


Fig. 2A

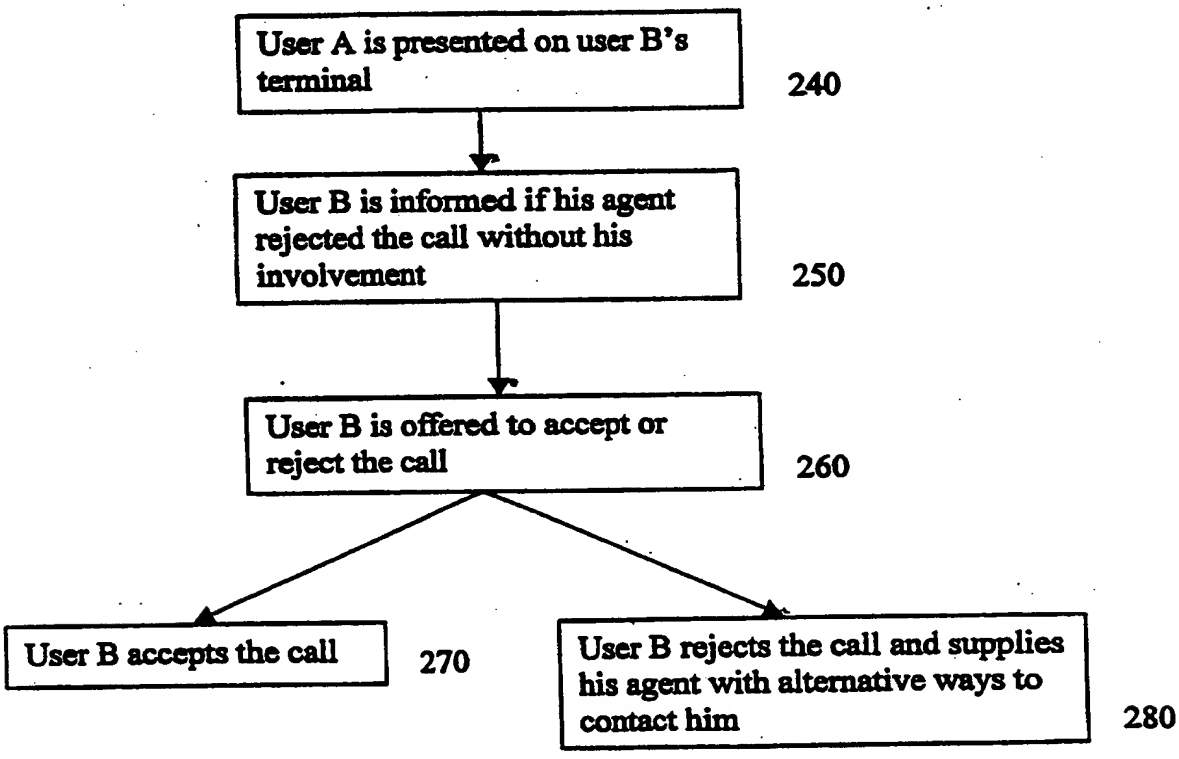


Fig. 2B

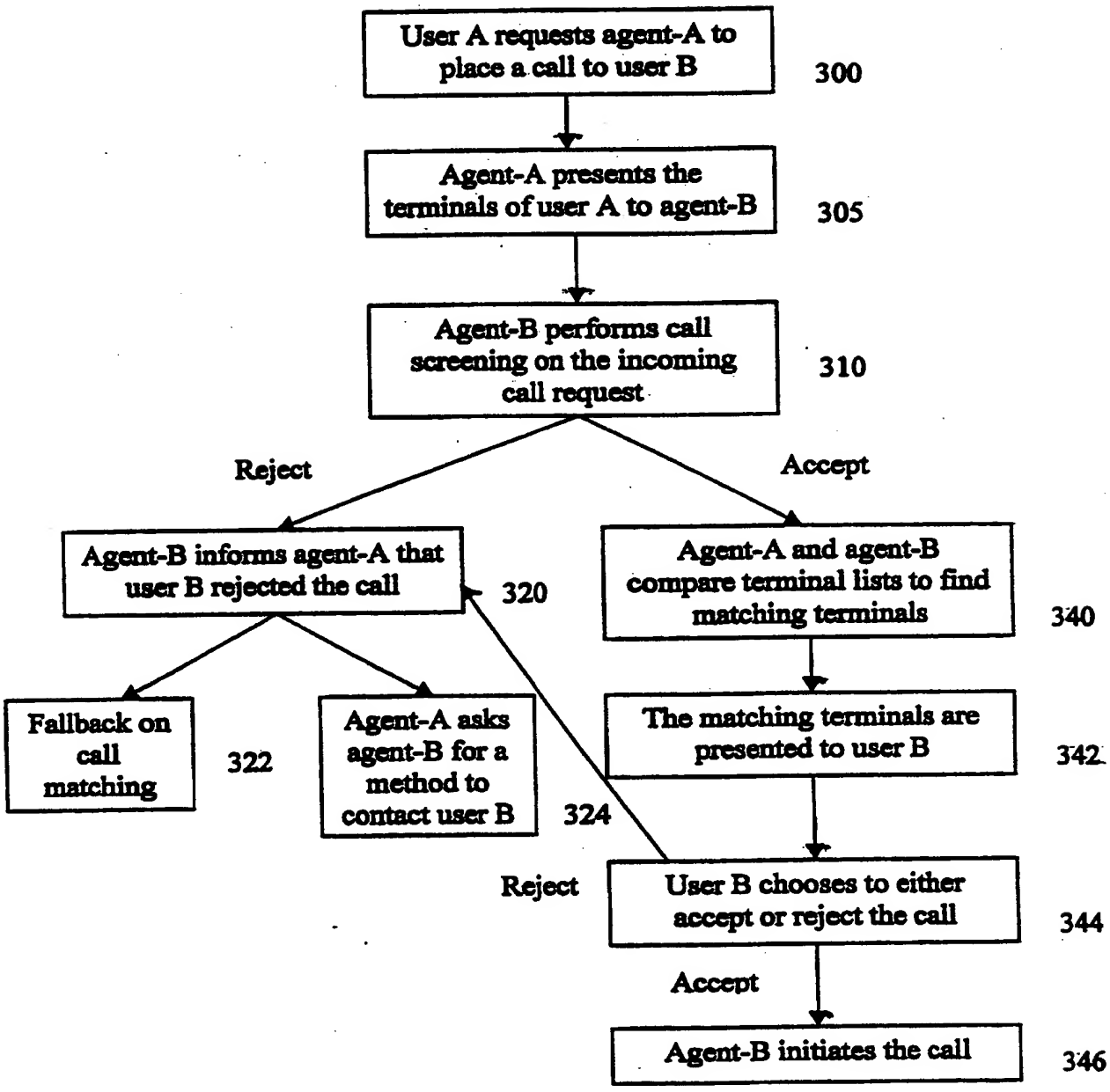

User A requests agent-A to place a call to user B
300
Agent-A presents the terminals of user A to agent-B
305
Agent-B performs call screening on the incoming call request
310
Reject
Accept
Agent-B informs agent-A that user B rejected the call
320
Agent-A and agent-B compare terminal lists to find matching terminals
340
Fallback on call matching
322
Agent-A asks agent-B for a method to contact user B
324
The matching terminals are presented to user B
342
Reject
User B chooses to either accept or reject the call
344
Accept
Agent-B initiates the call
346

Fig. 3

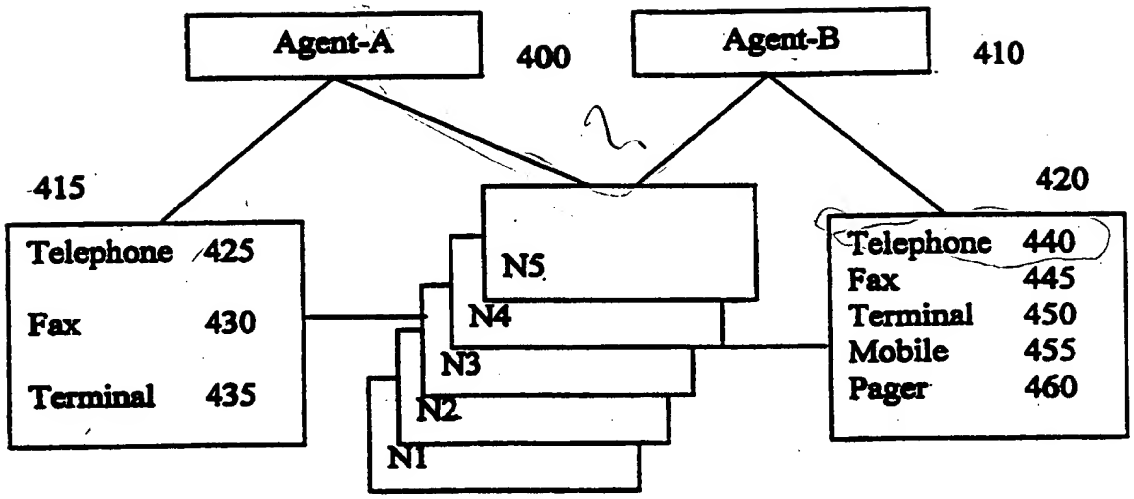

Agent-A
400
Agent-B
410
415
Telephone 425
Fax 430
Terminal 435
N5
N4
N3
N2
N1
420
Telephone 440
Fax 445
Terminal 450
Mobile 455
Pager 460

Fig. 4

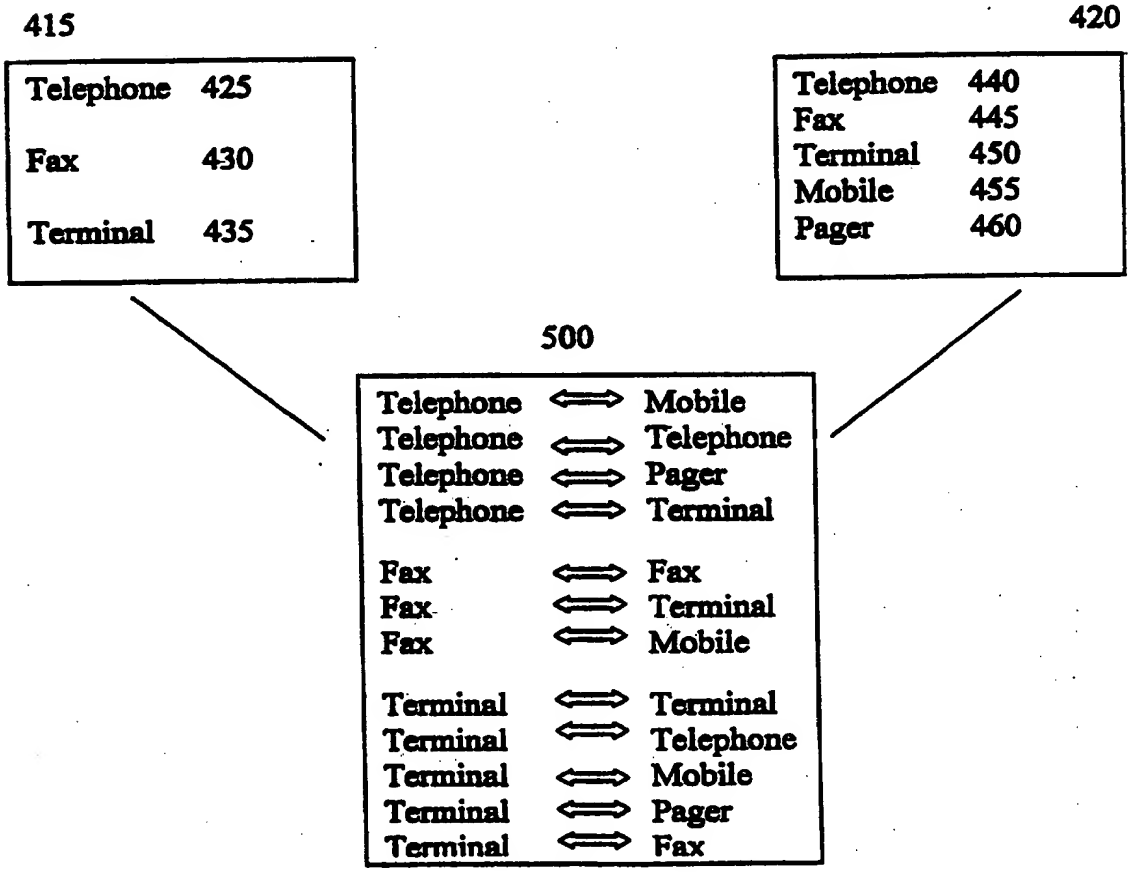

415
Telephone 425
Fax 430
Terminal 435
420
Telephone 440
Fax 445
Terminal 450
Mobile 455
Pager 460
500
Telephone ⟺ Mobile
Telephone ⟺ Telephone
Telephone ⟺ Pager
Telephone ⟺ Terminal
Fax ⟺ Fax
Fax ⟺ Terminal
Fax ⟺ Mobile
Terminal ⟺ Terminal
Terminal ⟺ Telephone
Terminal ⟺ Mobile
Terminal ⟺ Pager
Terminal ⟺ Fax

Fig. 5

INTERNATIONAL SEARCH REPORT

Inter onal Application No
PCT/SE 99/02204

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q3/00 H04M3/48

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 504 837 A (GRIFFETH ET AL.) 2 April 1996 (1996-04-02) abstract column 1, line 11 - line 32 column 4, line 44 - line 67 column 6, line 42 - line 54 column 7, line 32 - line 47	1,11
Y	WO 98 00959 A (HARRIS CORPORATION) 8 January 1998 (1998-01-08) abstract page 1, line 14 -page 2, line 8 page 3, line 11 - line 29 page 8, line 21 -page 10, line 13	1,11

-/—

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 February 2000	23/02/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Larcinese, C

1

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/SE 99/02204

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 454 032 A (PINARD ET AL.) 26 September 1995 (1995-09-26) abstract column 1, line 8 - line 20 column 1, line 65 - line 31	1-16
A	US 5 329 578 A (BRENNAN ET AL.) 12 July 1994 (1994-07-12) abstract column 1, line 15 - line 51 column 4, line 19 -column 5, line 4	1-16

INTERNATIONAL SEARCH REPORT

information on patent family members

Inter ...nal Application No
PCT/SE 99/02204

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5504837 A	02-04-1996	AT 155307 T	15-07-1997
		AU 681150 B	21-08-1997
		AU 6796994 A	12-12-1994
		DE 69404146 D	14-08-1997
		DE 69404146 T	29-01-1998
		DK 698331 T	26-01-1998
		WO 9427411 A	24-11-1994
		EP 0698331 A	28-02-1996
		ES 2106542 T	01-11-1997
		FI 955404 A	09-11-1995
		GR 3024954 T	30-01-1998
		JP 8510369 T	29-10-1996
		NO 954493 A	09-01-1996
WO 9800959 A	08-01-1998	US 6011843 A	04-01-2000
		AU 3589997 A	21-01-1998
		EP 0908043 A	14-04-1999
US 5454032 A	26-09-1995	CA 2088420 A,C	30-07-1994
		DE 4325773 A	04-08-1994
		GB 2274758 A,B	03-08-1994
		IT 1272540 B	23-06-1997
		MX 9304370 A	29-07-1994
US 5329578 A	12-07-1994	CA 2095568 A,C	27-11-1993